

fluid becomes alkaline; the mixture is boiled and filtered, the filtrate evaporated over a water bath to a syrupy consistence, and then extracted with alcohol; next the spirituous extract must be filtered, and the filtrate evaporated to a small quantity, over a water bath. To this, when quite cold, hydrochloric acid should be added so long as crystals are formed.

The crystals of hippuric acid obtained in this manner, seen under a microscope, are long and needle-shaped prisms; they are distinguished from those of benzoic acid by their insolubility in ether.

Hippuric acid, when evaporated to dryness with nitric acid, in a porcelain crucible, over a lamp, and then further heated to redness, gives off a gas smelling like oil of bitter almonds. This reaction is common to benzoic and hippuric acids.

When benzoic acid is taken by the mouth, it is converted in the body into hippuric acid, which appears in the urine in quantity equivalent to that of the benzoic acid ingested.

CHLORIDES.—Chlorides may be known to be present by the following test. To a fluid-drachm of urine in a test tube, a drop of nitric acid is added, and then a few drops of a solution of nitrate of silver; if a trace of chloride be present, a cloudiness only will be given; but if any quantity, a white precipitate is thrown down, soluble in caustic ammonia and reprecipitated thence by the addition of nitric acid in excess.

The nitric acid is added at first to prevent the precipitation of the phosphates with the chlorides.

By far the greater part of the chlorine in the urine is in combination with sodium.

A rough comparative idea of the quantity of chloride present may be made from day to day, by always taking the same quantity of urine, acidulating it in a test tube with nitric acid, and adding a solution of nitrate of silver until no further precipitate is formed. The test tube must then be set aside for 24 hours and a note then taken of the proportion of the chloride of silver deposit, for comparison with other observations.

On an average, a healthy male adult excretes 250 grains of chloride of sodium in the 24 hours.

Clinical Import. The chlorine is diminished or entirely absent during the period of hepatization in acute pneumonia; it is also diminished in acute rheumatism and many pyrexial diseases, especially when large serous transudation takes place.

PHOSPHATES.—The presence of phosphates in the urine may be ascertained by the following test. A fluid is prepared by adding a drop or two of caustic ammonia to a fluid-drachm of a solution of sulphate of magnesia in a test tube; hydrochloric acid is added until the precipitate caused by the ammonia is re-dissolved. Caustic ammonia is again added in excess, until the fluid is strongly ammoniacal. A fluid-drachm of urine is now poured into another test tube, and rendered ammoniacal with caustic ammonia; to this urine some of the prepared solution is added, and a precipitate of the ammoniacomagnesian phosphate occurs at once, if the urine contain the ordinary amount of phosphates; but the

precipitate forms slowly, if the phosphates are present in very small amount.

The normal quantity of phosphoric acid excreted by a male adult in the 24 hours is about 50 grains.

Clinical Import.—The amount of phosphoric acid in the urine is increased in diseases of the nervous centres, and after great mental application. Acute febrile diseases cause increase of the phosphoric acid from increased tissue-metamorphosis, while in Bright's disease and some forms of dyspepsia the quantity of the phosphates is diminished.

SULPHATES.—The sulphates are at once recognised by the addition to some of the urine, in a test tube, of a drop of hydrochloric acid, and afterwards of a few drops of a solution of chloride of barium; a white precipitate, insoluble in nitric acid, is thrown down.

The quantity of sulphuric acid excreted by a healthy male adult in the 24 hours is about 30 grains.

Clinical Import. The quantity of the sulphates is increased by a full animal diet; very little is known for certain of their amount in disease, and that little is at present of not much importance.

The following table of the amount of urinary constituents excreted by a male adult in the 24 hours is compiled from Dr. Parkes' work "On the composition of the Urine."

Quantity	40 to 50 fluid-ounces.
Total Solids	800 to 1000 grains.
Urea	350 to 600 grains.
Uric Acid	5 to 15 grains.
Chlorine	50 to 150 grains.
Phosphoric Acid....	30 to 60 grains.
Sulphuric Acid.....	20 to 60 grains.

URINARY SEDIMENTS.—When a urinary deposit is to be examined, about 4 or 5 fluid-ounces of the urine should be collected in a tall narrow cylindrical glass, and set aside for a few hours. Cylindrical glasses have, in the writer's experience, succeeded better than conical vessels, since the sloping sides of the latter tend to cause the sediment to collect on them, without falling to the bottom. This is particularly the case with uric acid and renal casts, especially if they are present in but small quantity.

When the sediment has collected at the bottom, the supernatant urine may be poured off, and a drop of the sediment placed on a glass slide, for examination under the microscope.

In looking for renal casts, it is better to use only the very last drops which fall from the vessel, after the rest of the urine is poured away.

Directions for the Microscope.—A drop of the fluid containing the deposit is placed in the centre of the glass slide (which must be absolutely clean), and the drop very gradually covered with a piece of thin glass, (seven-eighths of an inch square is the best size), so as to drive all the air before it, and to prevent any air bubbles being present under the glass. This is best accomplished by the aid of a needle, placing one edge of the thin glass upon the